



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/005,081	12/07/2001	Young Mo Gu	0465-0880P-SP	8567

2292 7590 03/29/2005

BIRCH STEWART KOLASCH & BIRCH  
PO BOX 747  
FALLS CHURCH, VA 22040-0747

EXAMINER

TORRES, JUAN A

ART UNIT	PAPER NUMBER
----------	--------------

2631

DATE MAILED: 03/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/005,081

Applicant(s)

GU ET AL.

Examiner

Juan A. Torres

Art Unit

2631

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 07 December 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-13 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-13 is/are rejected.
- 7) ☒ Claim(s) 1,2,4,7-10,12 and 13 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 December 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Priority***

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Drawings***

The drawings are objected to because:

a) In FIG. 1, 2A, 2B, 2C, 2D, 2E, 2F, 2G, 2H, 3A, 3B, 4,5A and 5B the recitation "Background Art in improper. It is suggested to be changed to "Prior Art".

b) In FIG.7A and 7B the adders 355, 356 and 359 are represented with a mixer symbol. It is suggested to change the mixer symbol by an adder symbol.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

Art Unit: 2631

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the method for processing a signal in a VSB receiver having a tuner, the method comprising the steps of: generating an intermediate frequency band signal by multiplying a received signal through the tuner by an intermediate frequency signal; generating a complex base band signal consisting of an I channel signal and a Q channel signal by multiplying the intermediate frequency band signal by an I channel local carrier wave signal and a Q channel local carrier wave signal; and complex matched filtering at least one of the I channel signal and the Q channel signal; must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

Art Unit: 2631

application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

The abstract of the disclosure is objected to because the recitation "A VSB" is improper. It is suggested to be changed to "A Vestigial Sideband (VSB)". Correction is required. See MPEP § 608.01(b).

The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Vestigial Sideband (VSB) receiver and method for processing receiving signal in the same".

The disclosure is objected to because of the following informalities:

a) In page 2 paragraph [0002] the recitation "a VSB" is improper. It is suggested to be changed to "a Vestigial Sideband (VSB)"

b) In page 2 after paragraph [0002] the recitation "Related Art" is improper. It is suggested to be changed to "Prior Art".

c) In page 3 paragraph [0006] the recitation "related art" is improper. It is suggested to be changed to "prior art".

d) In page 4 paragraph [0011] the recitation "related art" is improper. It is suggested to be changed to "prior art".

e) In page 4 paragraph [0013] the recitation " $v'c(t)=x'(t)\cos wct+x'h\sin wct$ " is improper. It is suggested to be changed to " $v'c(t)=x'(t)\cos wct+x'h(t)\sin wct$ ".

f) In page 5 paragraph [0019] the recitation " $v'i(t)=x'(t)\cos wit+x'h\sin wit$ " is improper. It is suggested to be changed to " $v'i(t)=x'(t)\cos wit+x'h(t)\sin wit$ ".

g) In page 5 paragraph [0020] the recitation " $vi(t)=x(t)\cos wit+xh\sin wit$ " is improper. It is suggested to be changed to " $vi(t)=x(t)\cos wit+xh(t)\sin wit$ ".

h) In page 8 paragraph [0031] the recitation "related art" is improper. It is suggested to be changed to "prior art".

i) In page 10 paragraph [0041] the recitation "related art" is improper. It is suggested to be changed to "prior art".

j) In page 11 paragraph [0044] the recitation "related art" is improper. It is suggested to be changed to "prior art".

k) In page 13 paragraph [0056] the recitation "filter 351 and the second base" is improper. It is suggested to be changed to "filter 351 and the third base".

l) In page 13 paragraph [0056] the recitation "output from the third base" is improper. It is suggested to be changed to "output from the second base".

m) In page 15 paragraph [0064] the recitation "FIG. 5A" is improper. It is suggested to be changed to "FIG. 6".

n) In page 15 paragraph [0064] the recitation "FIG. 5B" is improper. It is suggested to be changed to "FIG. 6".

o) In page 16 paragraph [0069] the recitation "asymmetrical around 0, as shown in FIGS. 8A and 8B" is improper because FIG. 8A is symmetrical.

Appropriate correction is required.

***Claim Objections***

Claim 1 is objected to because of the following informalities: the recitation "A VSB" is indefinite; it is suggested to be changed to "A Vestigial Sideband (VSB)".

Claim 2 is objected to because of the following informalities: in line 10 of claim 2 the recitation "the second base" is improper; it is suggested to be changed to "the third base".

Claim 4 is objected to because of the following informalities: in line 2 of claim 4 the recitation "a fifth base" is vague and indefinite; it is suggested to be changed to "a base".

Claim 4 is objected to because of the following informalities: in line 3 of claim 4 the recitation "a sixth base" is vague and indefinite; it is suggested to be changed to "a base".

Claim 4 is objected to because of the following informalities: in line 4 of claim 4 the recitation "a third adder" is vague and indefinite; it is suggested to be changed to "an adder".

Claim 4 is objected to because of the following informalities: in line 5 of claim 4 the recitation "signal to the real" is vague and indefinite; it is suggested to be changed to "signal used as the real" (see specification page 14 paragraph [0058]).

Claim 4 is objected to because of the following informalities: in line 6 of claim 4 the recitation "signal to the imaginary" is vague and indefinite; it is suggested to be changed to "signal used as the imaginary" (see specification page 14 paragraph [0058]).

Claim 7 is objected to because of the following informalities: in line 10 of claim 2 the recitation "the second base" is improper; it is suggested to be changed to "the third base".

Claim 8 is objected to because of the following informalities: in line 2 of claim 8 the recitation "a fifth base" is vague and indefinite; it is suggested to be changed to "a base".

Claim 8 is objected to because of the following informalities: in line 3 of claim 8 the recitation "a sixth base" is vague and indefinite; it is suggested to be changed to "a base".

Claim 8 is objected to because of the following informalities: in line 4 of claim 8 the recitation "a third adder" is vague and indefinite; it is suggested to be changed to "an adder".

Claim 8 is objected to because of the following informalities: in line 5 of claim 8 the recitation "signal to the real" is vague and indefinite; it is suggested to be changed to "signal used as the real" (see specification page 14 paragraph [0058]).

Claim 8 is objected to because of the following informalities: in line 6 of claim 8 the recitation "signal to the imaginary" is vague and indefinite; it is suggested to be changed to "signal used as the imaginary" (see specification page 14 paragraph [0058]).

Claim 9 is objected to because of the following informalities: in line 2 of claim 9 the recitation " $2\cos(w_c - w_i)t$ " is and indefinite; it is suggested to be changed to " $2\cos(w_c - w_i)t$ ;  $w_c = 2\pi f_c$  where  $f_c$  is the frequency of the carrier signal and  $w_i = 2\pi f_i$  where  $f_i$  is the frequency of the intermediate frequency signal".



Claim 10 is objected to because of the following informalities: in line 2 of claim 10 the recitation " $2\cos w_i t$ " is and indefinite; it is suggested to be changed to " $2\cos w_i t$ ;  $w_i = 2\pi f_i$  where  $f_i$  is the frequency of the intermediate frequency signal".

Claim 12 is objected to because of the following informalities: in line 2 of claim 12 the recitation " $2\cos(w_c - w_i)t$ " is and indefinite; it is suggested to be changed to " $2\cos(w_c - w_i)t$ ;  $w_c = 2\pi f_c$  where  $f_c$  is the frequency of the carrier signal and  $w_i = 2\pi f_i$  where  $f_i$  is the frequency of the intermediate frequency signal".

Claim 13 is objected to because of the following informalities: in line 2 of claim 13 the recitation " $2\cos w_i t$ " is and indefinite; it is suggested to be changed to " $2\cos w_i t$ ;  $w_i = 2\pi f_i$  where  $f_i$  is the frequency of the intermediate frequency signal".

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle (US 5872815), and further in view of Franks ("Carrier and Bit Synchronization in Data Communication--A Tutorial Review", IEEE Transactions on Communications, Publication Date: Aug 1980 On page(s): 1107- 1121 Volume: 28, Issue: 8).

As per claim 1 Strolle discloses a VSB receiver comprising: an intermediate frequency signal generator generating an intermediate frequency band signal from a received signal (figure 1 block 102 column 6 line 15 and column 6 lines 27-30); a demodulator generating a complex base band signal consisting of an I channel signal and a Q channel signal using the intermediate frequency band signal and at least one local carrier wave signal (figure 1 block 52 column 6 line 15); and a base band matched filter filtering at least one of the I channel signal and the Q channel signal (figure 1 block 110 column 6 line 46). Strolle doesn't disclose specifically that the matched filter is complex even though he acknowledges that prior art uses complex matched filters (column 9 lines 11-14). Franks discloses that the complex base band matched filter (page 119 figure 10 appendix). Strolle and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Strolle with the low-pass equivalent operation on complex envelope signals disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Strolle with Franks to obtain the invention as specified in claim 1.

As per claim 2 Strolle and Franks disclose claim 1. Franks also discloses that the complex base band matched filter includes a first base band matched filter filtering a real domain of the I channel signal, a second base band matched filter filtering an imaginary domain of the I channel signal, a third base band matched filter filtering a real

Art Unit: 2631

domain of the Q channel signal, a fourth base band matched filter filtering an imaginary domain of the Q channel signal, a first adder adding the filtered real domain signals of the I channel and the Q channel output from the first base band matched filter and the third base band matched filter to output the resultant value as a new I channel signal, and a second adder adding the filtered imaginary domain signals of the I channel and the Q channel output from the second base band matched filter and the fourth base band matched filter to output the resultant value as a new Q channel signal (page 119 figure 10 appendix). Strolle and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Strolle with the low-pass equivalent operation on complex envelope signals disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Strolle with Franks to obtain the invention as specified in claim 2.

As per claim 4 Strolle and Franks discloses claim 1. Franks also discloses that the complex base band matched filter includes a base band matched filter filtering the I channel signal, a base band matched filter filtering the Q channel signal, and a adder adding the filtered I channel signal used as the real domain and the filtered Q channel signal used as the imaginary domain to output the added complex signal as a I channel signal (page 119 figure 10 appendix). Strolle and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have

Art Unit: 2631

been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Strolle with the low-pass equivalent operation on complex envelope signals disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Strolle with Franks to obtain the invention as specified in claim 4.

Claim 3 rejected under 35 U.S.C. 103(a) as being unpatentable over Strolle (US 5872815) and Franks ("Carrier and Bit Synchronization in Data Communication--A Tutorial Review", IEEE Transactions on Communications, Publication Date: Aug 1980 On page(s): 1107- 1121 Volume: 28, Issue: 8) as applied to claim 1 above, and further in view of Endres (US 6426972). Strolle and Franks discloses claim 1. Strolle and Franks don't specifically disclose that the complex base band matched filter is designed so that a frequency characteristic is identical to a frequency spectrum of the base band signal. Franks discloses that the complex base band matched filter is designed so that a frequency characteristic is identical to a frequency spectrum of the base band signal (column 3 line 61 to column 5 line 4). Strolle, Franks and Endres are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Strolle and Franks with the frequency characteristics detail disclosed by Endres. The suggestion/motivation for doing so would have been to reduce the inter-symbol interference in the filtering operation (Endres column 4 line 2-4).

Therefore, it would have been obvious to combine Strolle and Franks with Endres to obtain the invention as specified in claim 3.

Claims 5, 7-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Claydon (US 5724396), and further in view of Franks ("Carrier and Bit Synchronization in Data Communication--A Tutorial Review", IEEE Transactions on Communications, Publication Date: Aug 1980 On page(s): 1107- 1121 Volume: 28, Issue: 8).

As per claim 5 Claydon discloses a receiver comprising: a first multiplier multiplying a receiving signal by an intermediate frequency signal to generate an intermediate frequency band signal (figure 3 block 24 column 6 lines 40-42); a second multiplier multiplying the intermediate frequency band signal by a first local carrier wave signal to demodulate the intermediate frequency band signal to an I channel signal (figure 3 block 1 column 6 lines 44-50); a third multiplier multiplying the intermediate frequency band signal by a second local carrier wave signal to demodulate the intermediate frequency band signal to a Q channel signal (figure 3 block 2 column 6 lines 44-50). Claydon doesn't disclose a complex base band matched filter filtering at least one of the demodulated I channel signal and the demodulated Q channel to output a complex signal. Franks discloses a complex base band matched filter filtering at least one of the demodulated I channel signal and the demodulated Q channel to output a complex signal (page 119 figure 10 appendix). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The

suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 5.

As per claim 7 Claydon and Franks discloses claim 5. Franks also discloses that the complex base band matched filter includes a first base band matched filter filtering a real domain of the I channel signal, a second base band matched filter filtering an imaginary domain of the I channel signal, a third base band matched filter filtering a real domain of the Q channel signal, a fourth base band matched filter filtering an imaginary domain of the Q channel signal, a first adder adding the filtered real domain signals of the I channel and the Q channel output from the first base band matched filter and the third base band matched filter to output the resultant value as a new I channel signal, and a second adder adding the filtered imaginary domain signals of the I channel and the Q channel output from the second base band matched filter and the fourth base band matched filter to output the resultant value as a new Q channel signal (page 119 figure 10 appendix). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 7.

As per claim 8 Claydon and Franks discloses claim 5. Franks also discloses that the complex base band matched filter includes a base band matched filter filtering the I channel signal, a base band matched filter filtering the Q channel signal, and an adder adding the filtered I channel signal used as the real domain and the filtered Q channel signal used as the imaginary domain to output the added complex signal as a I channel signal (page 119 figure 10 appendix). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 8.

As per claim 9 Claydon and Franks discloses claim 5. Claydon also discloses the intermediate frequency signal is  $2\cos(w_c - w_i)t$  (figure 3 block 33 column 6 lines 44-46). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 9.

As per claim 10 Claydon and Franks discloses claim 5. Claydon also discloses that the first local carrier wave is  $2\cos\omega t$ , and the second local carrier wave is  $2\sin\omega t$ . (figure 3 blocks 1 and 2 column 6 lines 46-53). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 10.

As per claim 11 Claydon discloses a method for processing a signal in a VSB receiver having a tuner, the method comprising the steps of: generating an intermediate frequency band signal by multiplying a received signal through the tuner by an intermediate frequency signal (figure 3 block 24 column 6 lines 40-42); generating a complex base band signal consisting of an I channel signal and a Q channel signal by multiplying the intermediate frequency band signal by an I channel local carrier wave signal and a Q channel local carrier wave signal (figure 3 blocks 1 and 2 column 6 lines 44-50). Claydon doesn't disclose a complex matched filtering at least one of the I channel signal and the Q channel signal. Franks discloses a complex matched filtering at least one of the I channel signal and the Q channel signal (page 119 figure 10 appendix). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of



Art Unit: 2631

ordinary skill in the art to supplement the method disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 11.

As per claim 12 Claydon and Franks discloses claim 11. Claydon also discloses the intermediate frequency signal is  $2\cos(w_c - w_i)t$  (figure 3 block 33 column 6 lines 44-46). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have been obvious to combine Claydon with Franks to obtain the invention as specified in claim 12.

As per claim 13 Claydon and Franks discloses claim 11. Claydon also discloses that the first local carrier wave is  $2\cos w_i t$ , and the second local carrier wave is  $2\sin w_i t$ . (figure 3 blocks 1 and 2 column 6 lines 46-53). Claydon and Franks are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the receiver disclosed by Claydon with the matched filter disclosed by Franks. The suggestion/motivation for doing so would have been to reduce cross coupling of the I and Q components in the filtering operation (Franks page 119). Therefore, it would have

Art Unit: 2631

been obvious to combine Claydon with Franks to obtain the invention as specified in claim 13.

Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Claydon (US 5724396) and Franks ("Carrier and Bit Synchronization in Data Communication--A Tutorial Review", IEEE Transactions on Communications, Publication Date: Aug 1980 On page(s): 1107- 1121 Volume: 28, Issue: 8) as applied to claim 5 above, and further in view of Endres (US 6426972). Claydon and Franks discloses claim 5. Claydon and Franks don't specifically disclose that the complex base band matched filter is designed so that a frequency characteristic is identical to a frequency spectrum of the base band signal. Franks discloses that the complex base band matched filter is designed so that a frequency characteristic is identical to a frequency spectrum of the base band signal (column 3 line 61 to column 5 line 4). Claydon, Franks and Endres are analogous art because they are from the same field of endeavor. At the time of the invention, it would have been obvious to a person of ordinary skill in the art to supplement the matched filter disclosed by Claydon and Franks with the frequency characteristics detail disclosed by Endres. The suggestion/motivation for doing so would have been to reduce the inter-symbol interference in the filtering operation (Endres column 4 line 2-4). Therefore, it would have been obvious to combine Claydon and Franks with Endres to obtain the invention as specified in claim 6.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Strolle (US 5799037) discloses a receiver for demodulating

Art Unit: 2631


multiple digital modulation formats including vestigial sideband (VSB), quadrature amplitude modulation (QAM), offset QAM (OQAM) and also uses the denomination of "turner" as in claim 11 for the IF converter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Juan A. Torres whose telephone number is (571) 272-3119. The examiner can normally be reached on Monday-Friday 9:00 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad H. Ghayour can be reached on (571) 272-3021. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JAT  
12-1-2005

  
**MOHAMMED GHAYOUR**  
**SUPERVISORY PATENT EXAMINER**